



**Atmosphere Learning Progression
Grades K-2: GLOBE Protocols Aligned with NASA Resources and NGSS Standards**



NGSS Disciplinary Core Ideas Progression of Learning: Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region and time. People record weather patterns over time to learn more about the interactions that occur within our Earth system. Through participating in a series of GLOBE and NASA learning activities, interacting with the characters in the Elementary GLOBE Storybooks, and collecting data using the GLOBE protocols, students have the opportunity to engage in authentic science learning experiences. Using science journals to record their observations, students become scientists as they explore the world around them.

([NASA Langley GLOBE Resource Page: www.globe.gov/web/nasa-langley-research-center/home/resources](http://www.globe.gov/web/nasa-langley-research-center/home/resources))

<p>Performance Expectations: K-PS2-1 Make observations to determine the effect of sunlight on Earth's surface. K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time. K-ESS3-2 Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather. 1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.</p>		
<p>Science Practices: Asking Questions and Defining Problems: Ask questions based on observations to find more information about the world. Planning and Carrying Out Investigations: Make observations (firsthand or from media) to collect data that can be used to make comparisons. Analyzing and Interpreting Data: Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. Obtaining, Evaluating, and Communicating Information: Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world.</p>	<p>Disciplinary Core Idea: ESS1.B Earth and the Solar System: Seasonal patterns of sunrise and sunset can be observed, described, and predicted. ESS2.D Weather and Climate: Weather is the combination of sunlight, wind, snow, or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. ESS3.B: Natural Hazards: Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that communities can prepare for and respond to these events.</p>	<p>Crosscutting Concepts: Patterns: Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. Cause and Effect: Events have causes that generate observable patterns.</p>
<p align="center">GLOBE Alignment: Environmental observations, data collection, and learning activities to develop Earth science concepts</p>		
<p>Atmosphere Protocols: Air Temperature Clouds Surface Temperature Precipitation</p> <p>Data Investigation Sheets: Atmosphere Investigation Integrated 1-Day Atmosphere Investigation Clouds 1-Day Atmosphere Investigation Surface Temperature</p> <p>Elementary GLOBE Storybooks: It's All About Earth Do You Know the Clouds have Names?</p>	<p>GLOBE Learning Activities:</p> <ol style="list-style-type: none"> All Year Long: Seasonal Changes in a particular habitat (K-PS2-1, K-ESS2-1, 1-ESS1-2) Weather Adds Up to Climate: Weather patterns over a long period of time can be used to describe climate (K-ESS2-1, K-ESS3-2, 1-ESS1-2) Cloud Fun: Observe cumulus clouds and weather conditions (K-ESS2-1) Earth System Play: Interconnections of Earth systems (K-PS2-1) Making a Sundial: Construct a sundial and observe the movement of the sun through the sky over the course of a day (K-PS2-1, K-ESS2-1, 1-ESS1-2) <p>Art Connection: Cloudscape-Using a variety of craft materials students create their own sky with the different types of clouds that they observe in the sky. (K-ESS2-1)</p>	<p>Guiding Question(s):</p> <ol style="list-style-type: none"> How can we observe changes in sunlight on Earth's surface? How does the amount of daylight change over the year as the seasons change? What patterns do we observe in the weather (sunlight, wind, snow/rain, and temperature)? How is the weather connected to other parts of nature, like bodies of water and plants? How is weather predictable? Why is it important to listen to the weather forecast? How can we prepare for severe weather than can have harmful effects?
<p align="center">NASA Resources: Data and lessons drawn from NASA's Earth science research program</p>		
<p>Extension Learning Activities: ESSEA K-4 Climate: Air</p> <p>ESSEA K-4 Spheres: Air</p> <p>NASA's Climate Kids:</p> <p>NASA Wavelength Learning Activities List:</p>	<p>MY NASA DATA Live Access Server Data Visualization Tool: Earth System Data Explorer</p> <p>My NASA Data Variable Suggestions: Air Temperature: Monthly Near-Surface Air Temperature (ISCCP) Clouds: Monthly Cloud Coverage (CERES TERRA) Surface Temperature: Monthly Surface Skin Temperature (CERES) Precipitation: Monthly Precipitation (GPCP)</p>	<p>NASA Lessons: Creating a Bar Graph (K-ESS3-2) The Sun's Energy (K-PS2-1) The Sky and Dichotomous Key (K-ESS2-1, K-ESS3-2)</p>

Developed by NASA Langley Research Center, Updated February 2018

